

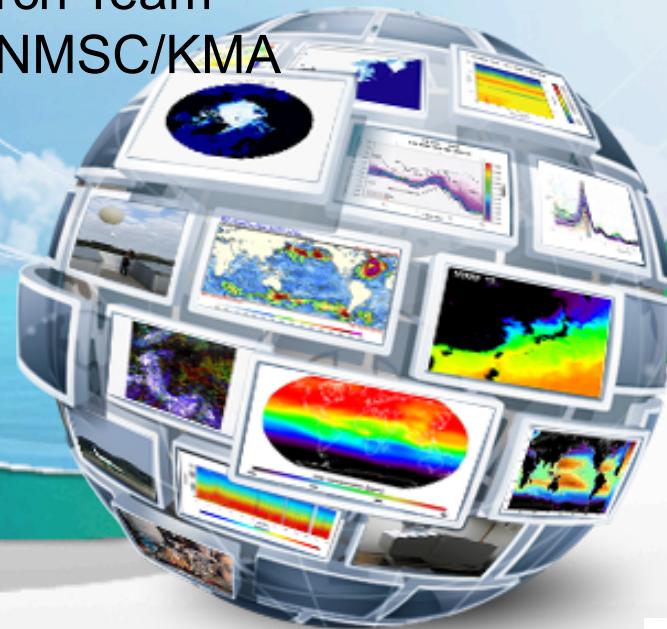
2015 NASA PMM Science Team Meeting, July 13-17, 2015, Baltimore, MD, USA

GPM Ground Validation Activit y over Korea

Jinho Shin, Geun-Hyeok Ryu
&

Remote Sensing Research Team
Satellite Analysis Division, NMSC/KMA

15 July 2015



Outline ♪

- **Direct Validation of GPM over Korea after GPM Launch (Part I)**
 - Expansion of Ground Validation(GV) over Korea
 - 1-year GPM GV - Normal Scan vs. Matched Scans
- **Precipitation Mechanism and Characteristics over East Asia (Part II)**
 - Cloud pattern composite for Cold and Warm type using Geostationary Satellite.
 - Precipitation mechanism based on radar observations
- **Plan for Snowfall GV and International Cooperation (Part III)**
 - Plan for GPM GV snowfall over Korea
 - Data exchange with NASA and 7th KMA-JAXA collaboration meeting

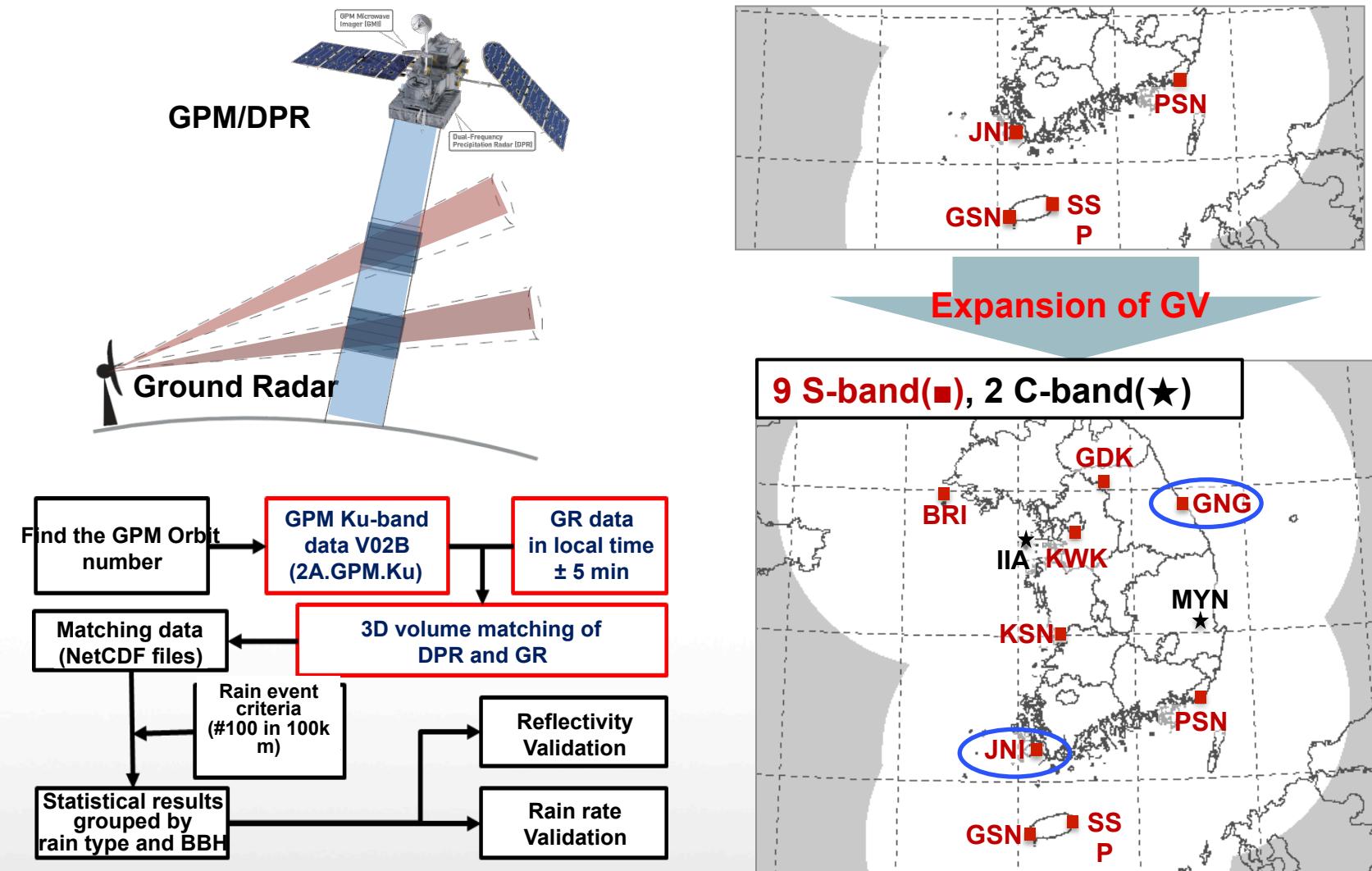
PART I:♪

Direct Validation of GPM over Korea after GPM Launch

Jinho Shin, Geun-Hyeok Ryu, Ki-Hong Park and Sung-Dae Yang♪

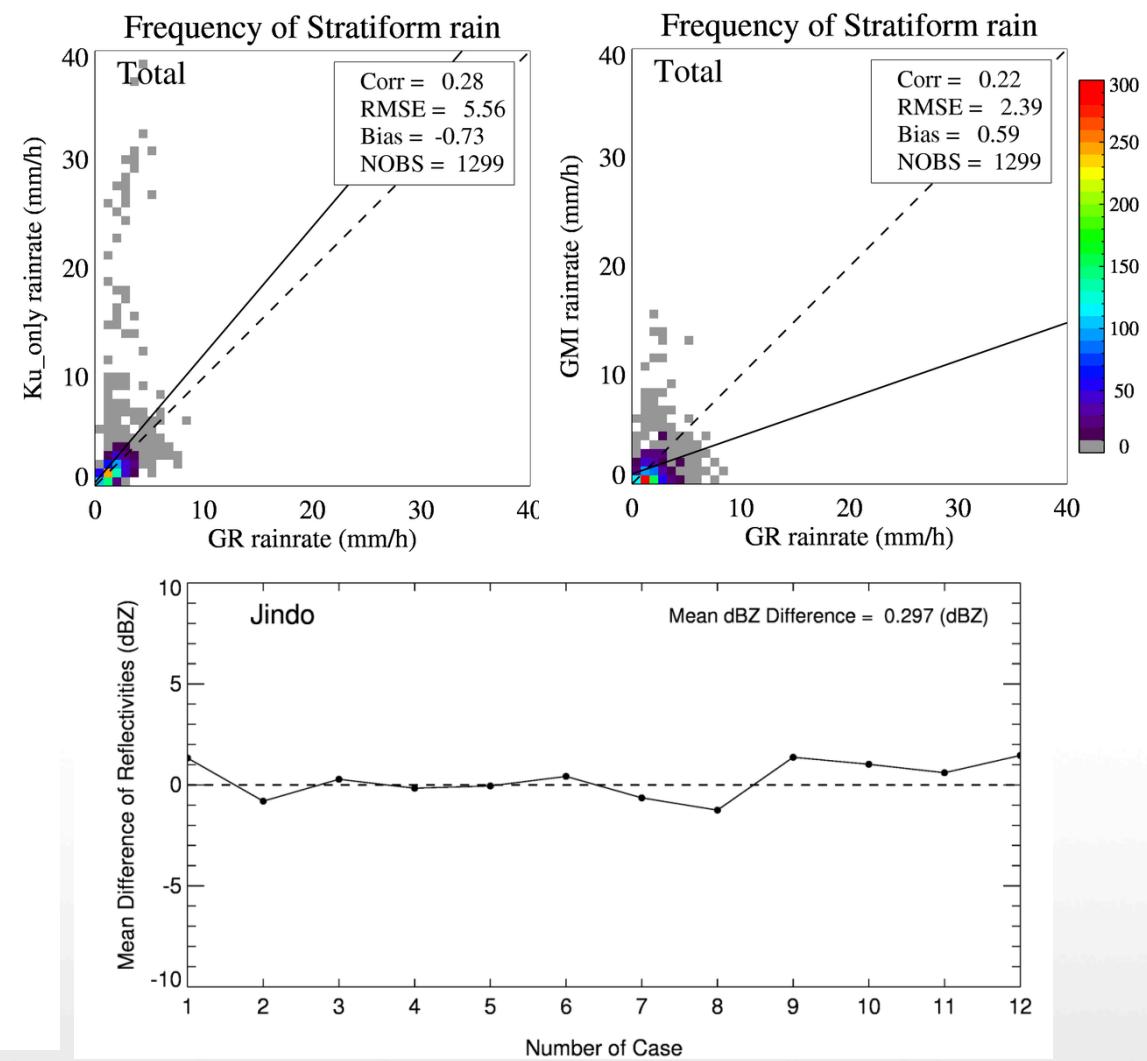
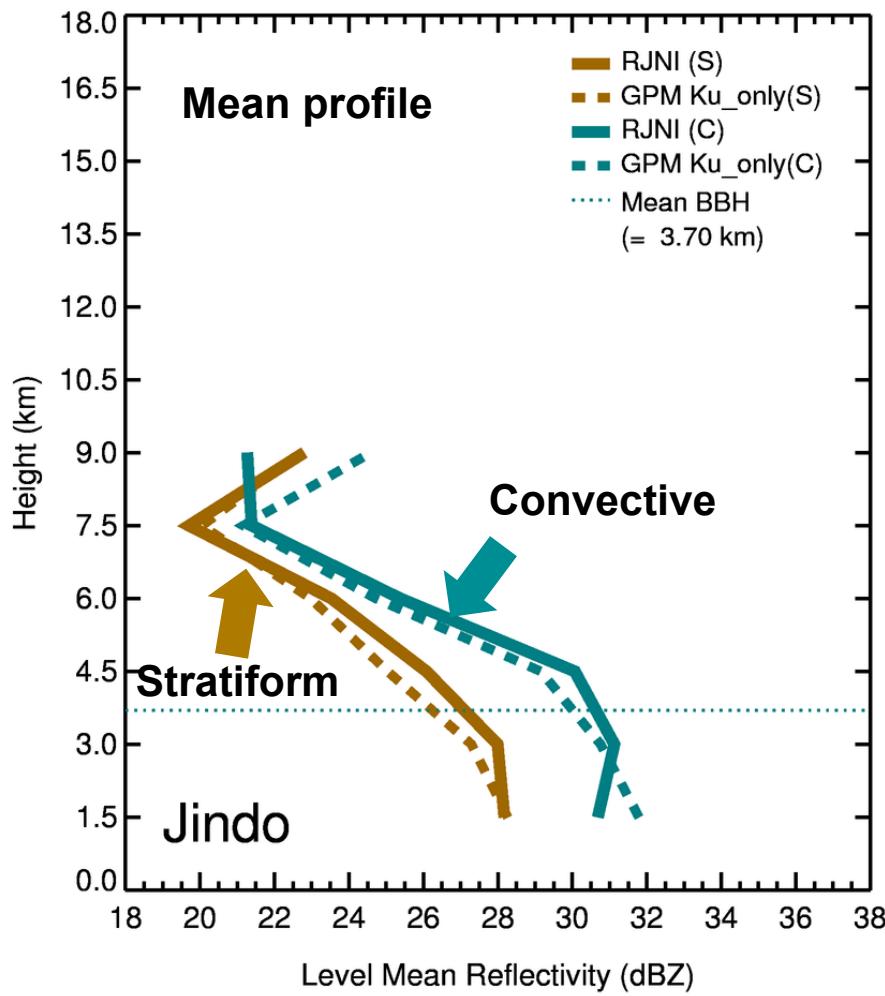
Satellite Analysis Division, NMSC/KMA♪

Expansion of GPM GV over Korea♪



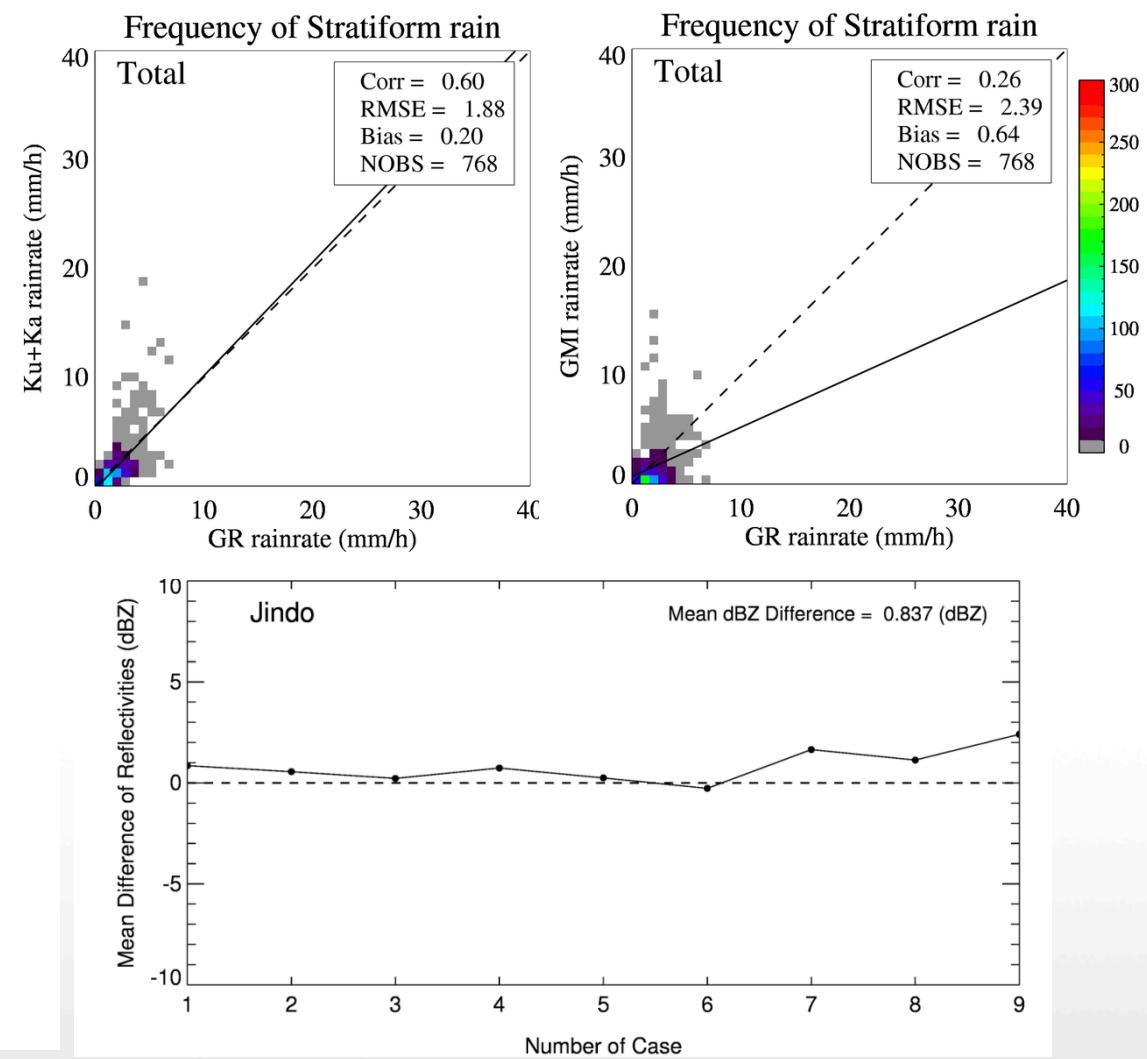
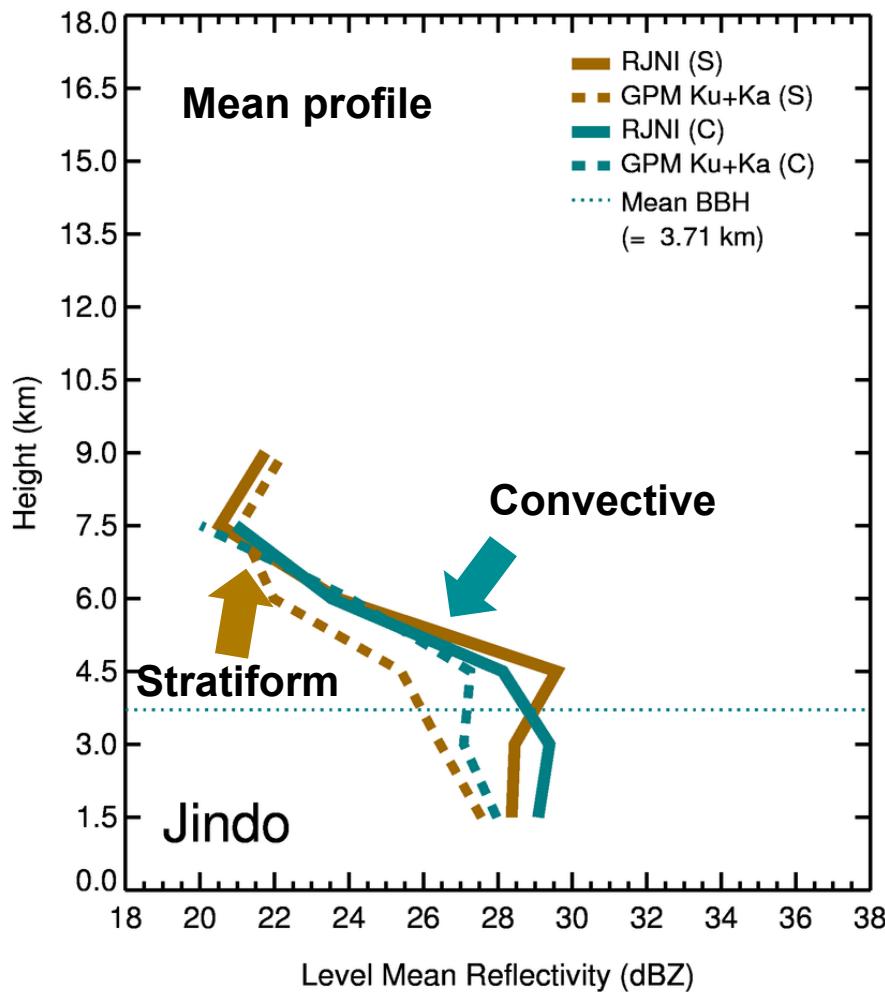
GPM Direct Validation @ JNI – Normal scan♪

Period : 2014. 3. 8. ~ 2015. 2. 28.



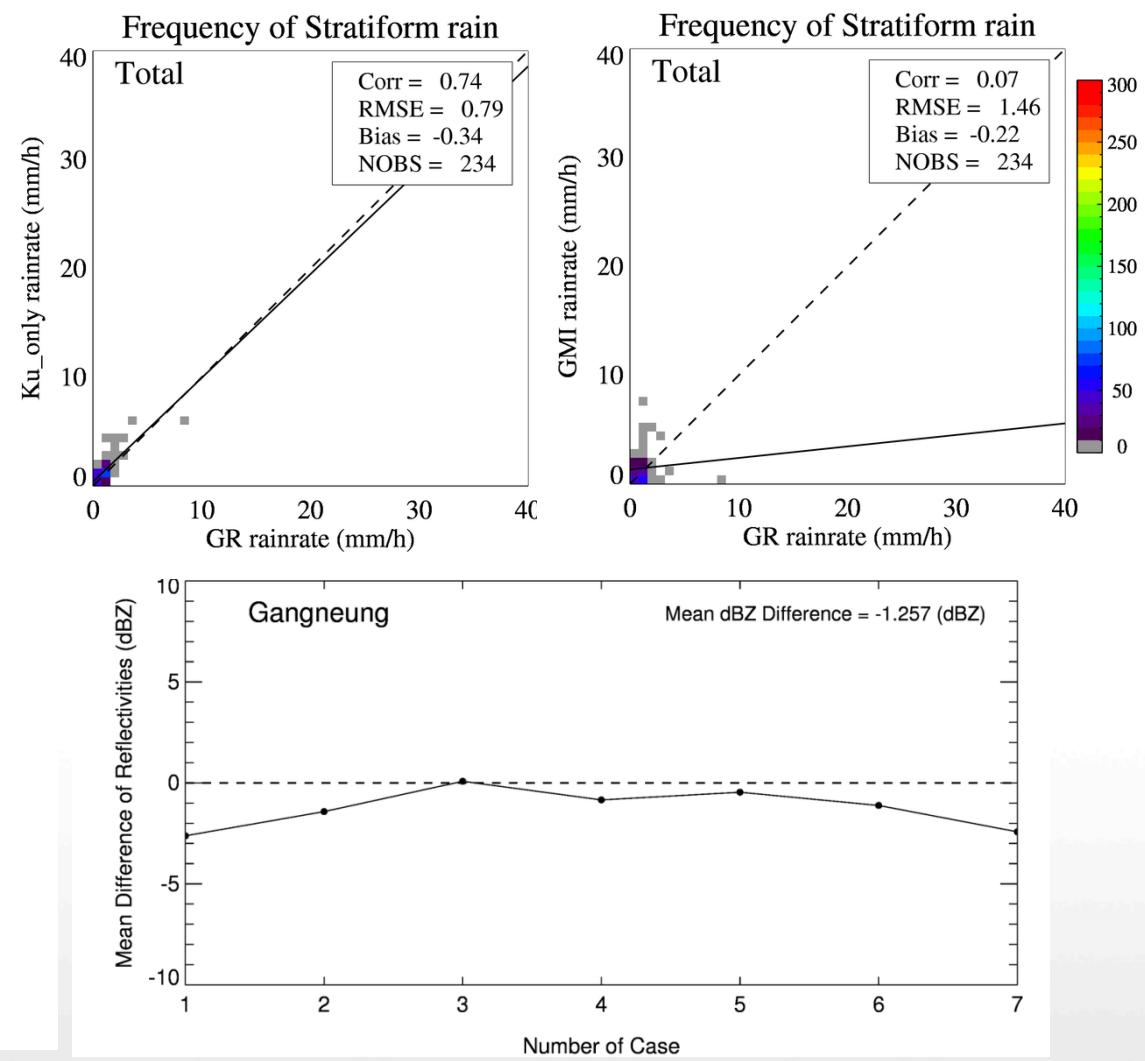
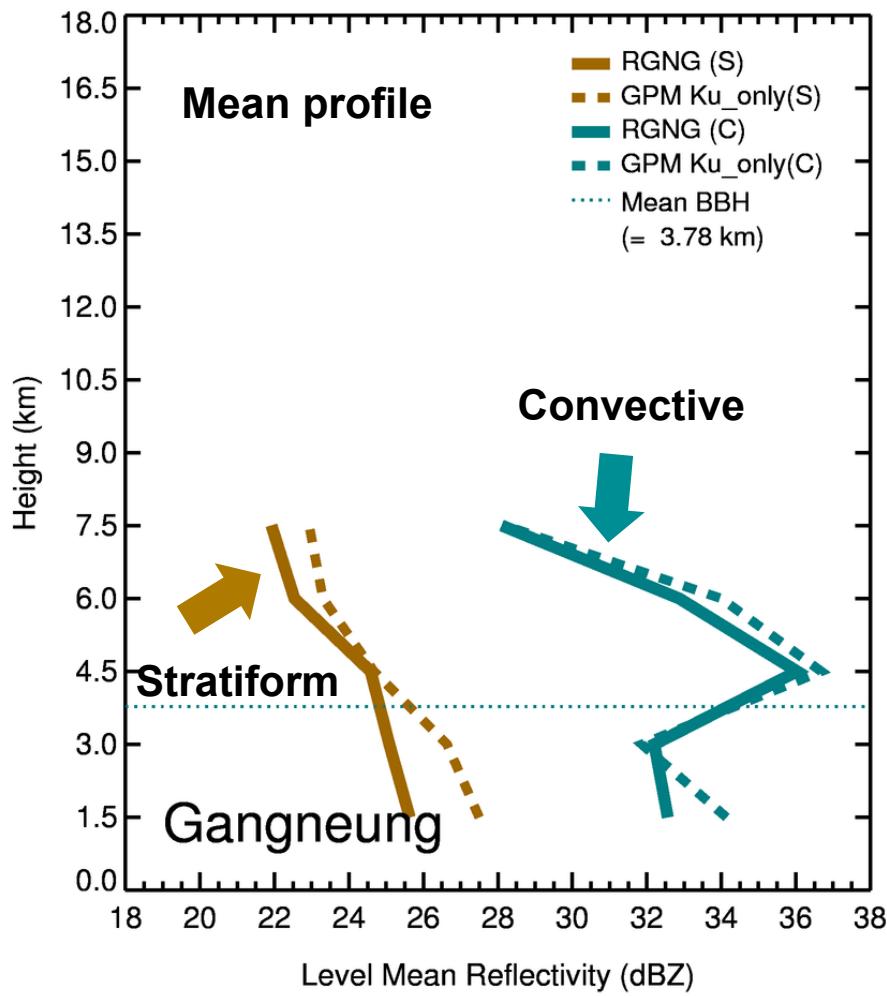
GPM Direct Validation @ JNI – Matched Scan♪

Period : 2014. 3. 8. ~ 2015. 2. 28.



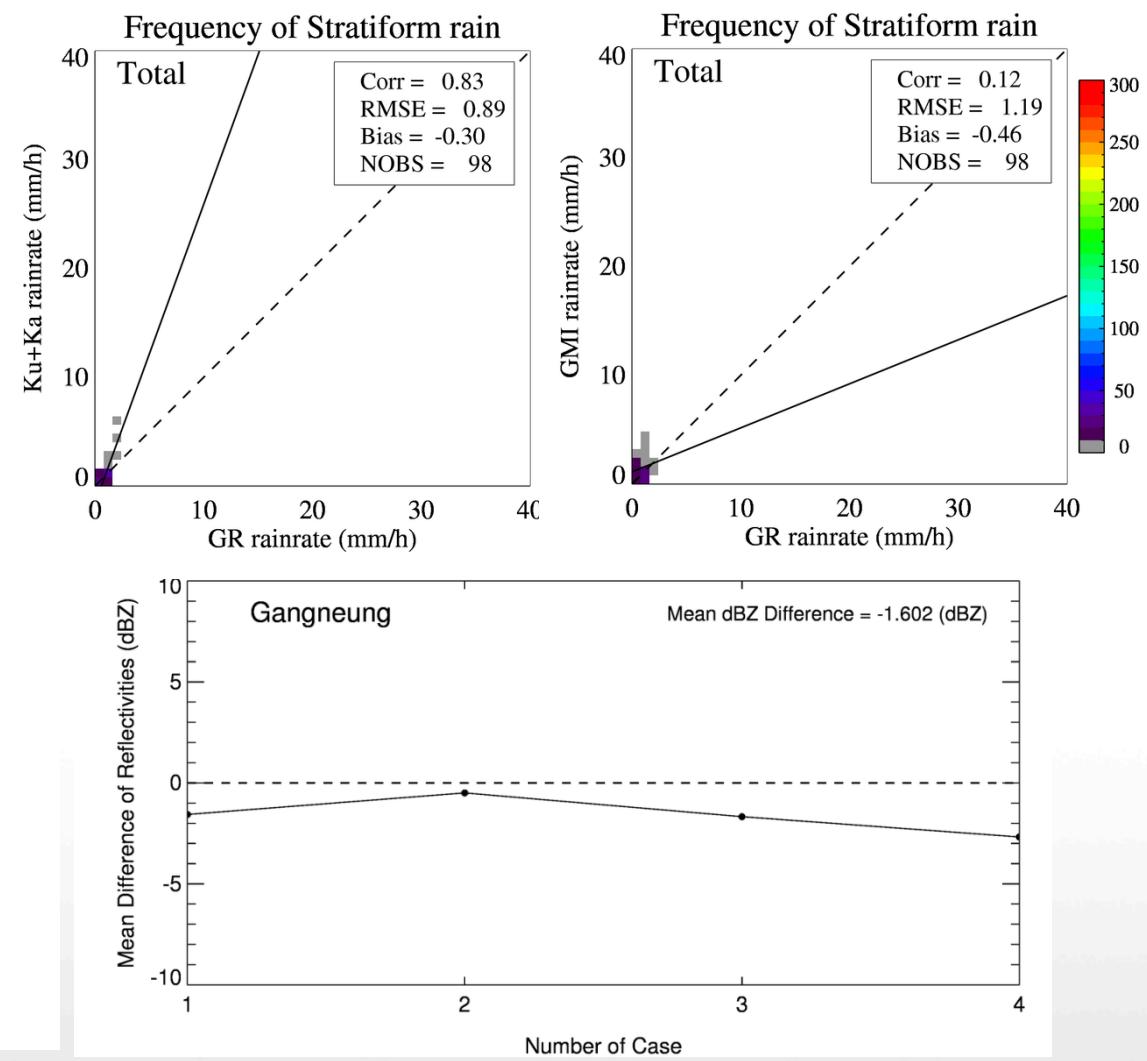
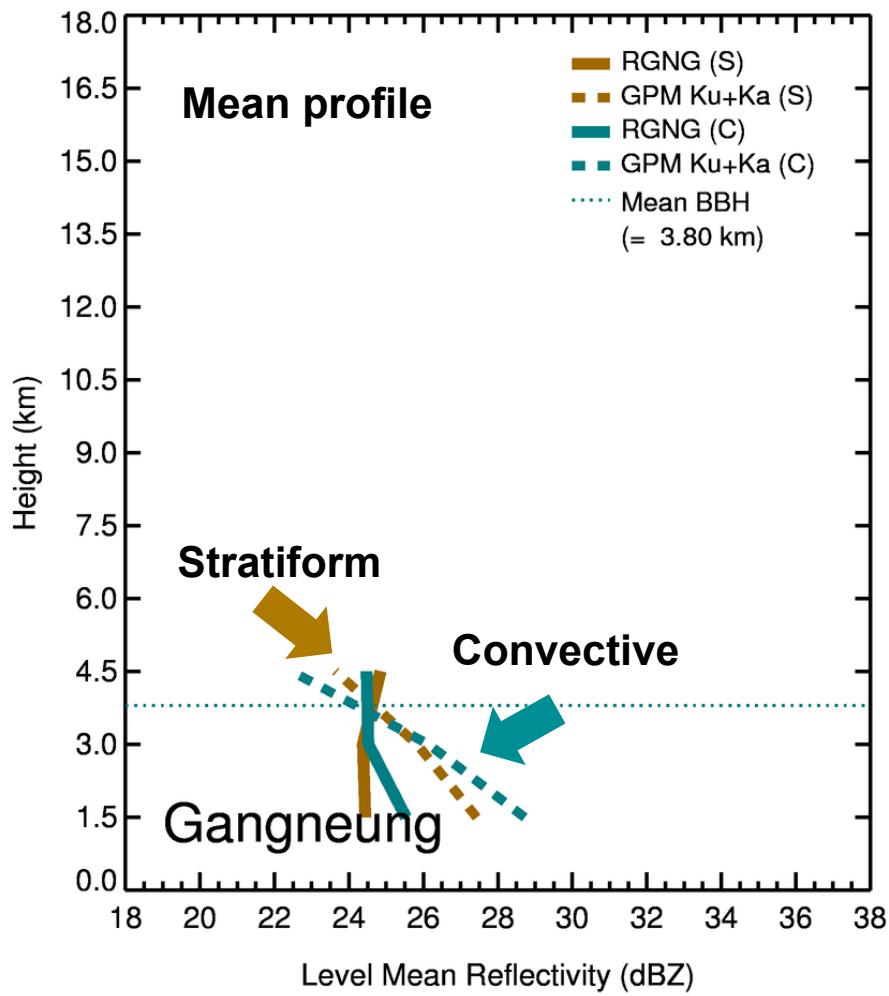
GPM Direct Validation @ GNG – Normal Scan♪

Period : 2014. 3. 8. ~ 2015. 2. 28.

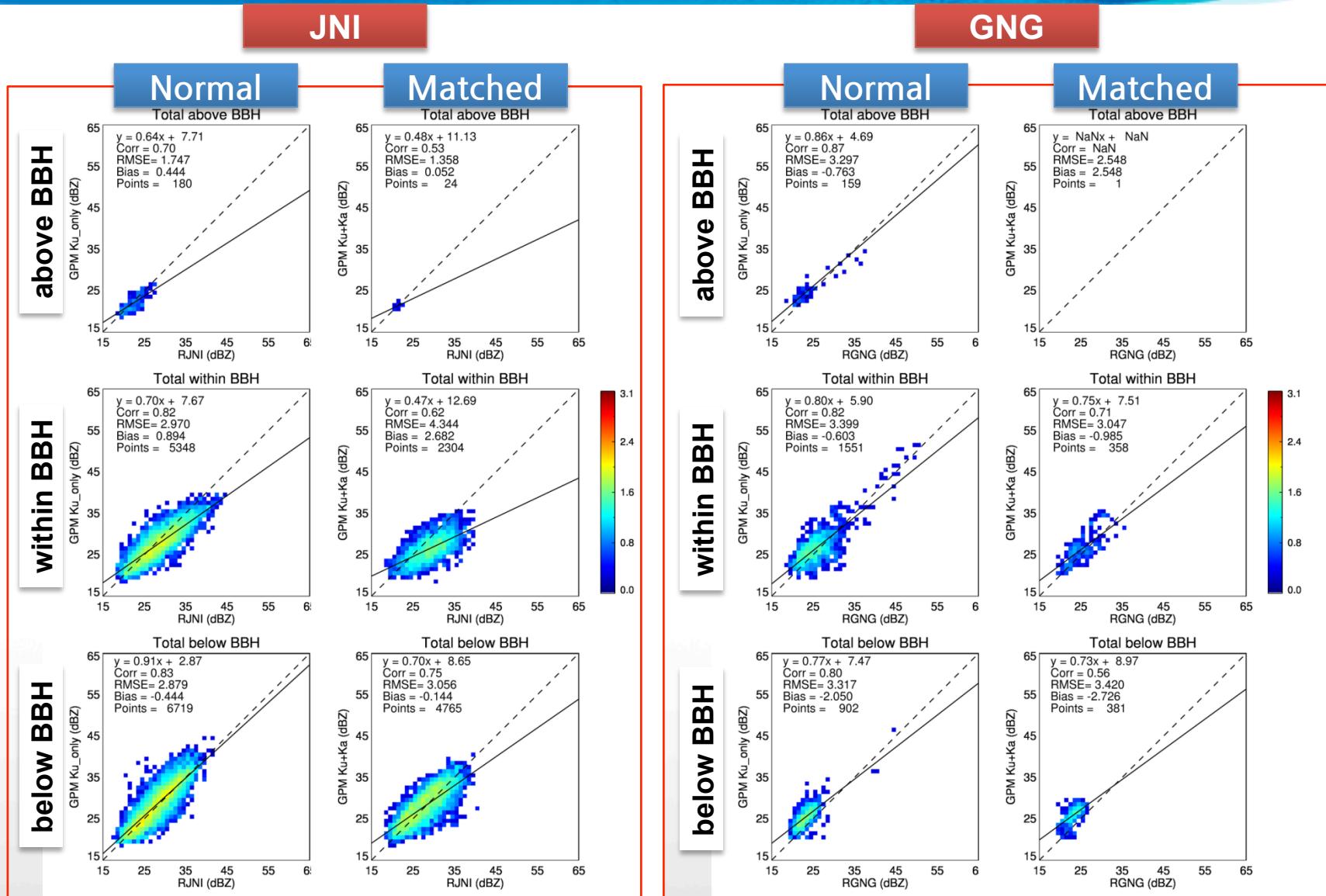


GPM Direct Validation @ GNG – Matched Scan♪

Period : 2014. 3. 8. ~ 2015. 2. 28.

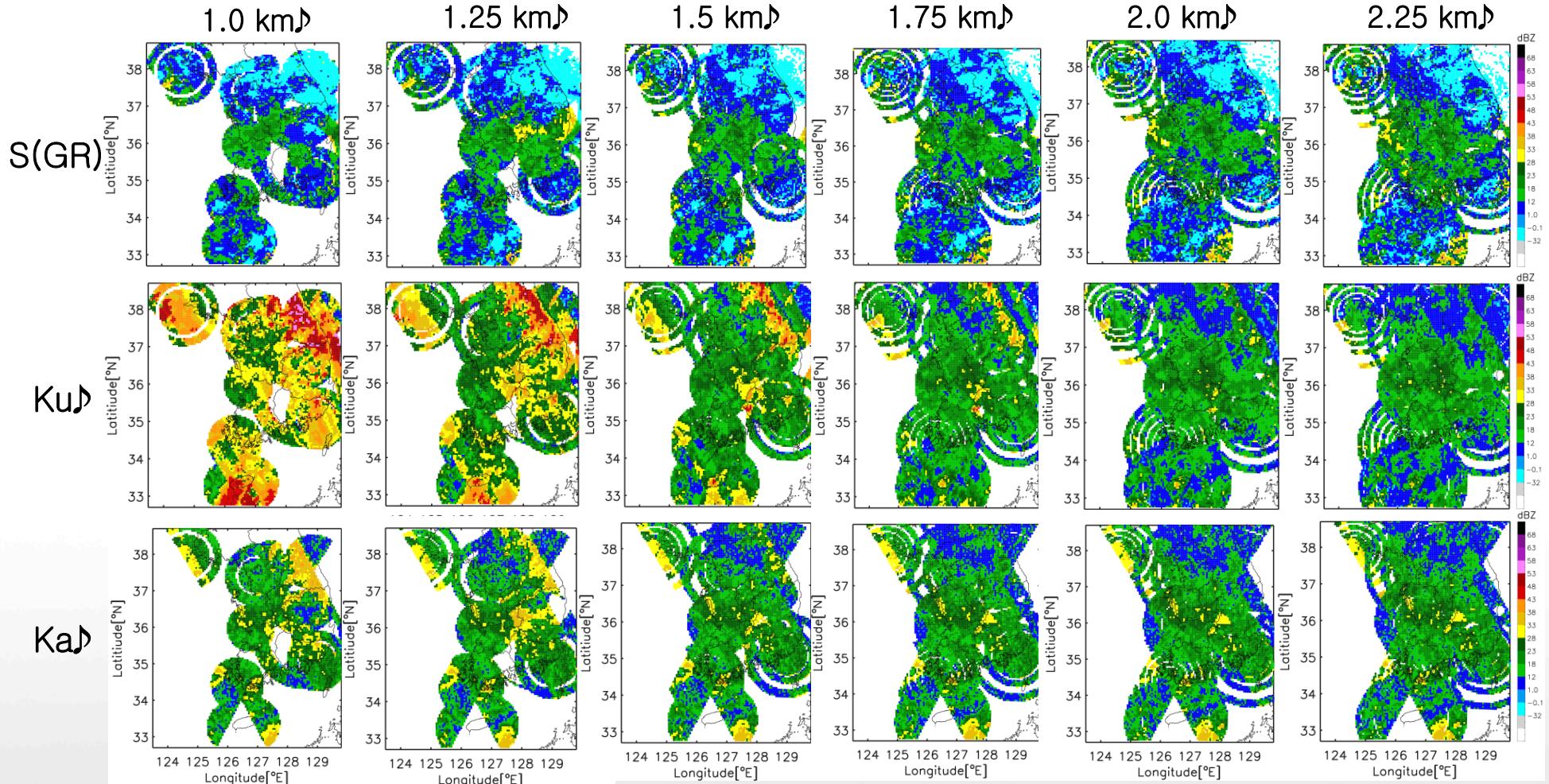


Direct Validation at Vertical Layers♪



Direct Validation with GR♪

- ❖ Comparison of mean reflectivity at each altitude for 7 rain cases ♪
(Max range=150~250km)♪



PART II:♪

Precipitation Mechanism and Characteristics over the East Asia

B.J. Sohn*, Hwan-Jin Song*, GyuWon Lee**, Cheonglyong Lee**, Sung-Hwa Jung**, Hye-young Ko**, Soohyun Kwon**, and Jinho Shin***♪

*Seoul National University

**Kyungpook National University

**Satellite Analysis Division, NMSC/KMA

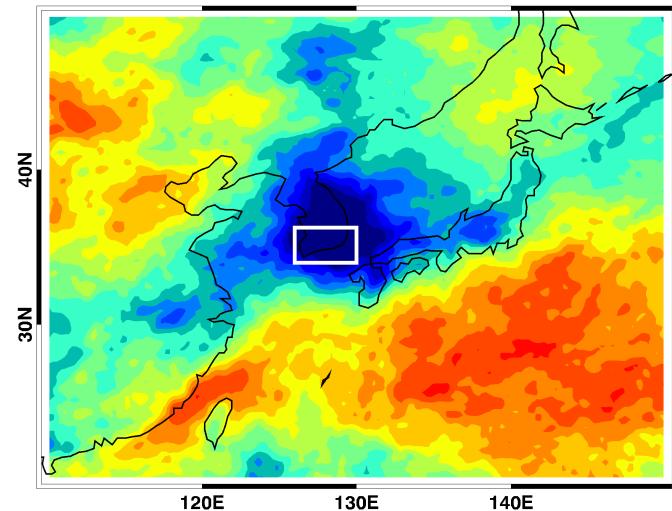
Cloud Pattern Composites

Geostationary satellites
JJA 2002-2011

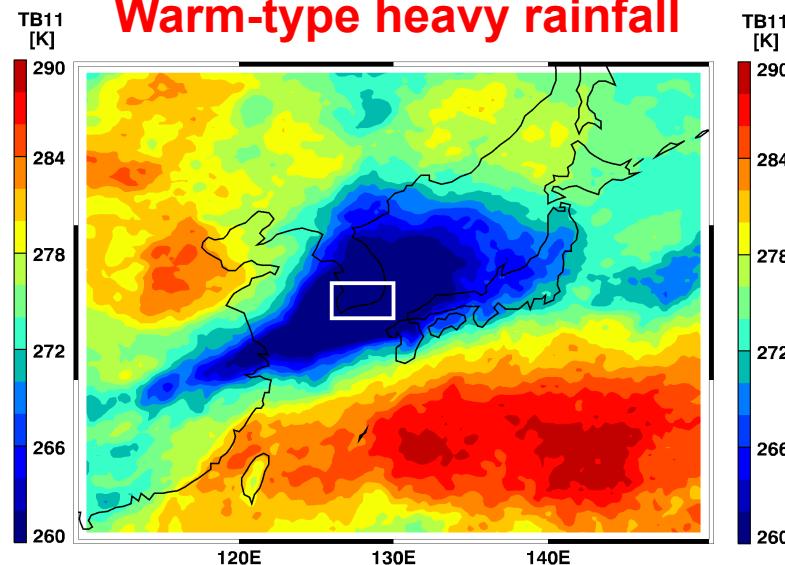
172
events

Small area
Oval shape

Cold-type heavy rainfall

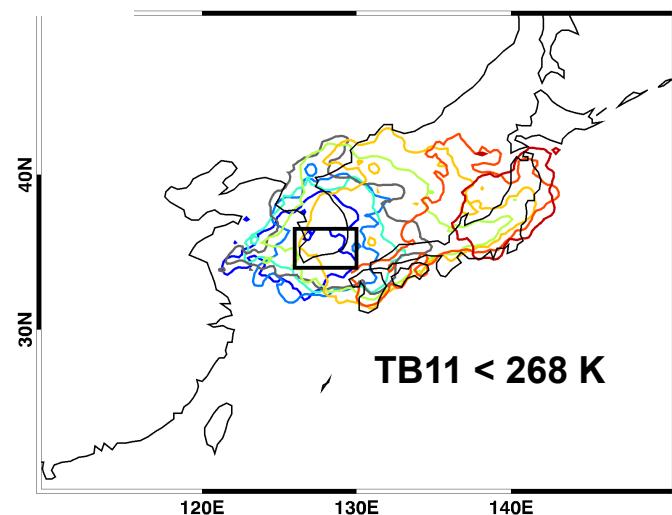


Warm-type heavy rainfall

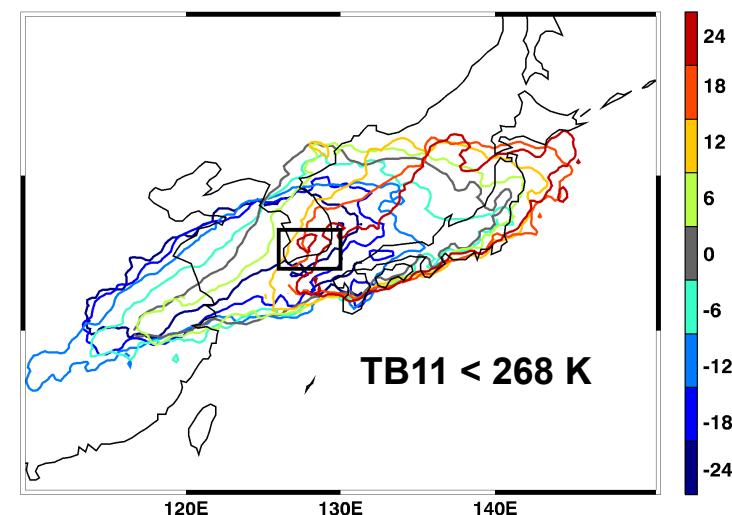


233
events

Extended



Short-lived, Eastward

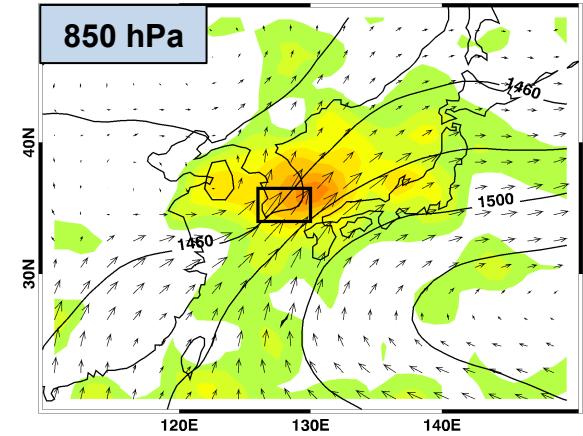
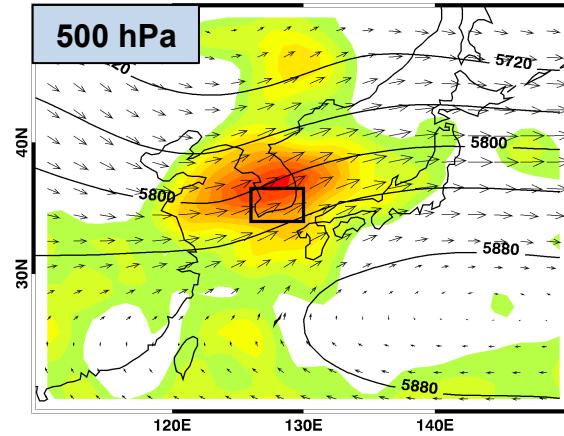
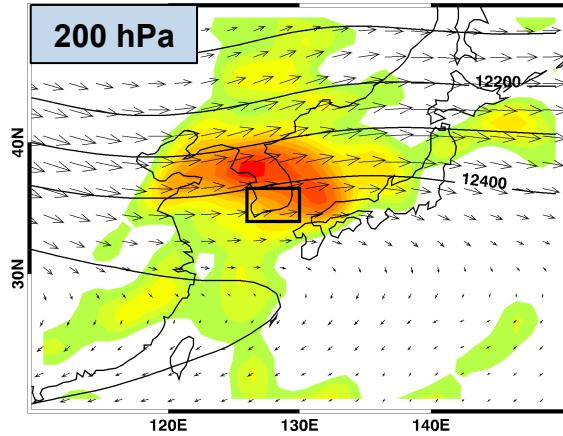


Long-lived, Northeastward

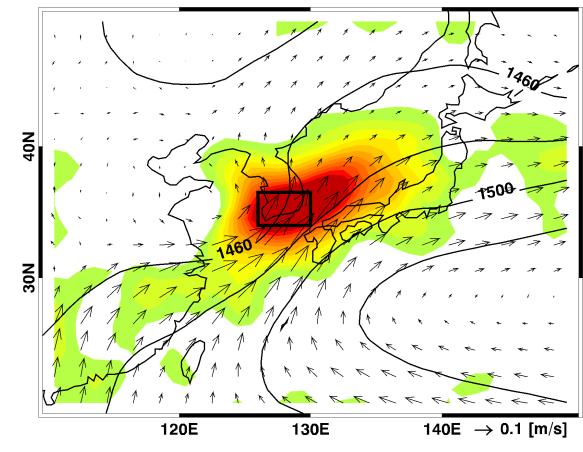
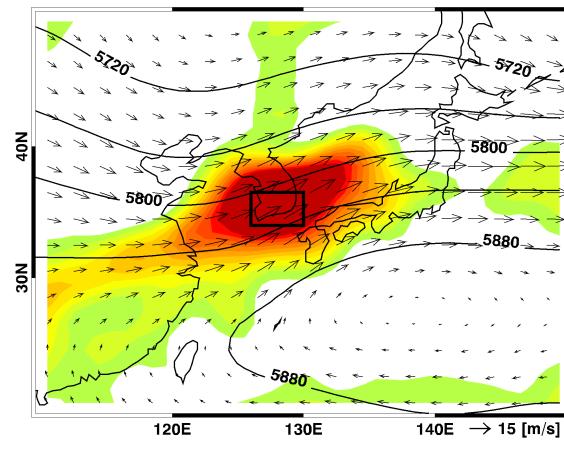
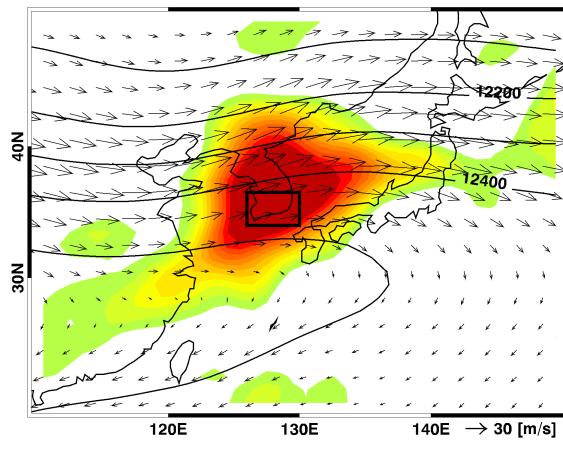
Synoptic-scale Composites

ERA-Interim
JJA 2002-2011▷

❖ Cold-type heavy rainfall



❖ Warm-type heavy rainfall: strong large-scale divergence & convergence !



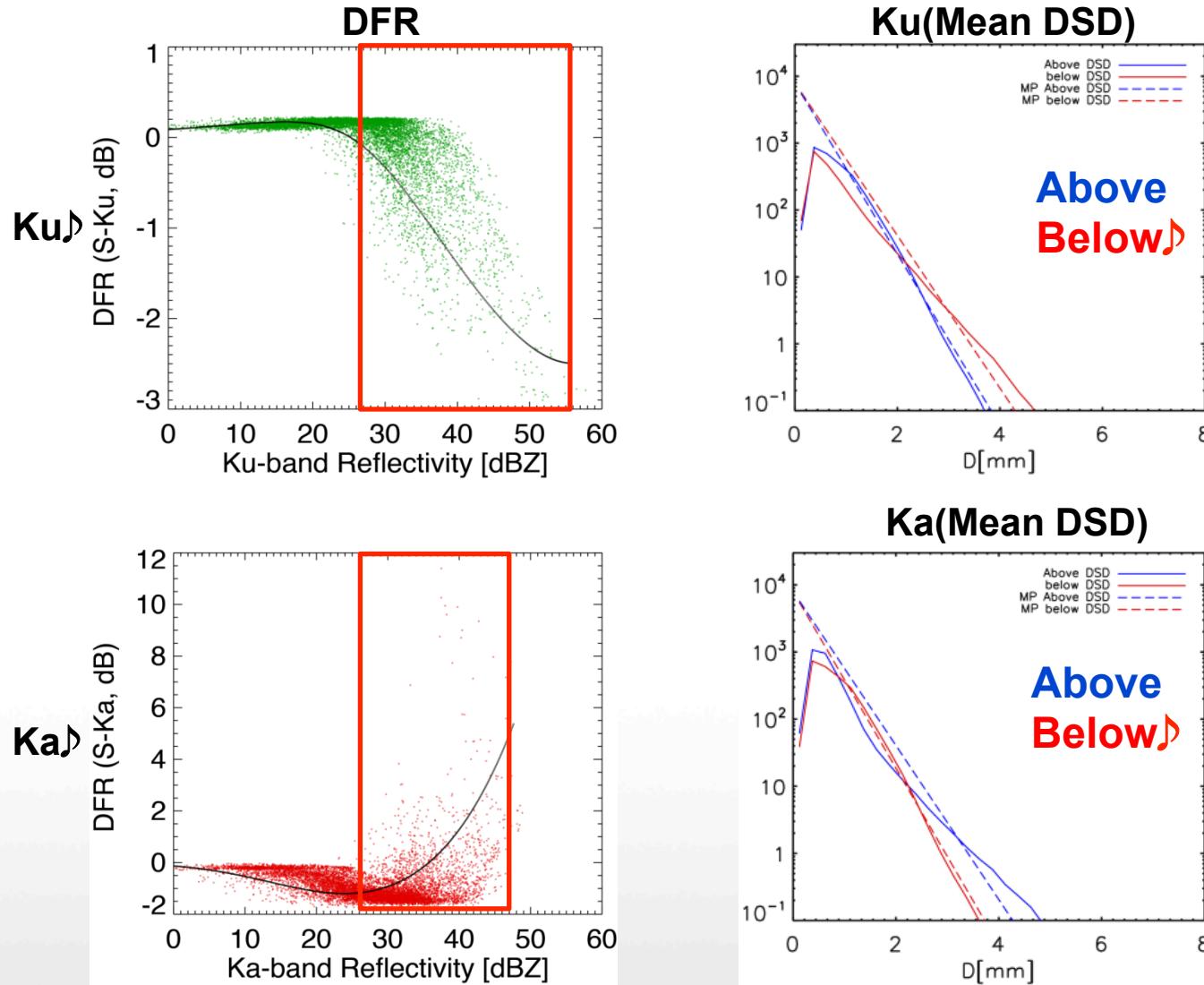
Solid line: $Z_{200 \text{ hPa}}$
Arrow: $V_{200 \text{ hPa}}$
Color: $\nabla \cdot V_{200 \text{ hPa}}$

$Z_{500 \text{ hPa}}$
 $V_{500 \text{ hPa}}$
 $\omega_{500 \text{ hPa}}$

$Z_{850 \text{ hPa}}$
 $qV_{850 \text{ hPa}}$
 $-\nabla \cdot Q$



Precipitation Mechanism observed by ground-based instrumentations



Solid lines: Marshall-Palmer DSDs

PART III:♪

Plan for snowfall GV and International Cooperation

Jinho Shin*, Geun-Hyeok Ryu*, and Gyu-Won Lee**♪

*Satellite Analysis Division, NMSC/KMA

**Kyungpook National University

Validation Plan

❖ Preparation for snowfall validation

1. Cloud Physics Observation Center (Deagwanyeong)

- Observations: clouds, aerosols and precipitation for cloud-physics
arches in mountainous area

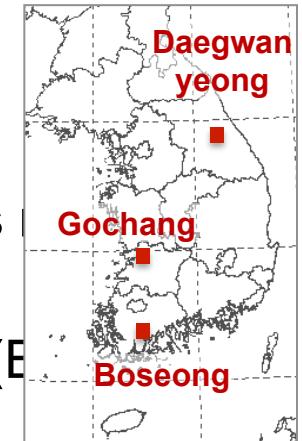
2. National Center of Intensive Observation for Severe Weather (Eong)

- Observation: Structure, formation and development of severe weather
- Equipment: Wind profiler, Radiometer, Optical rain gauge, Micro rain radar, etc.
- Related radar site: JNI Radar (southwest of the Korean peninsula)

3. Solid Precipitation Inter-Comparison Experiment

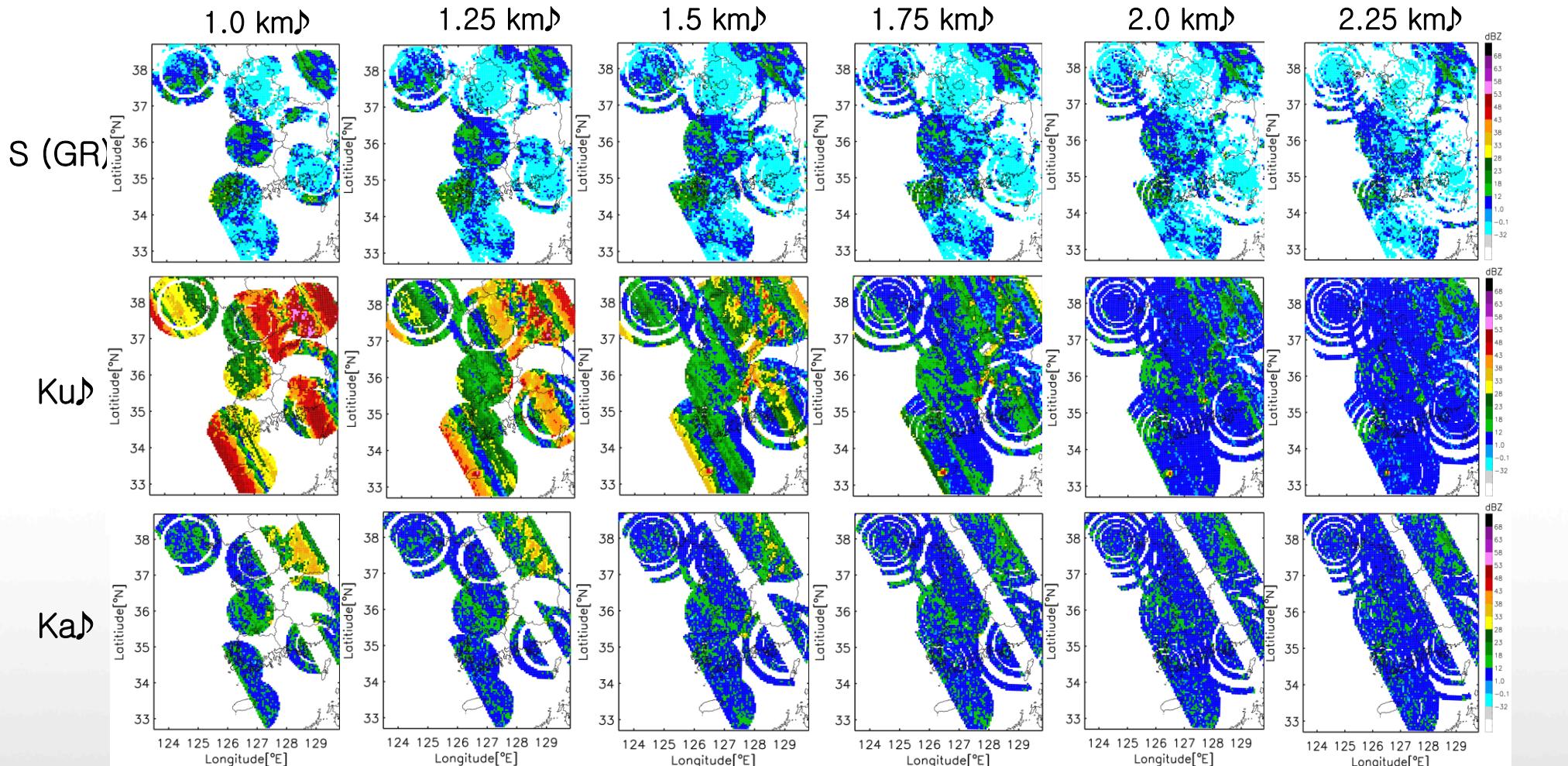
(SPICE, Gochang)

- Improving the accuracy of quantitative snow estimation and prediction for heavy snowfall over the Yellow Sea and the west coast of Korea



Direct Validation with GR♪

- ❖ Comparison of mean reflectivity at different heights for 4 snow cases♪
(Max. range = 150~250km)♪



International Cooperation in the Framework of GPM

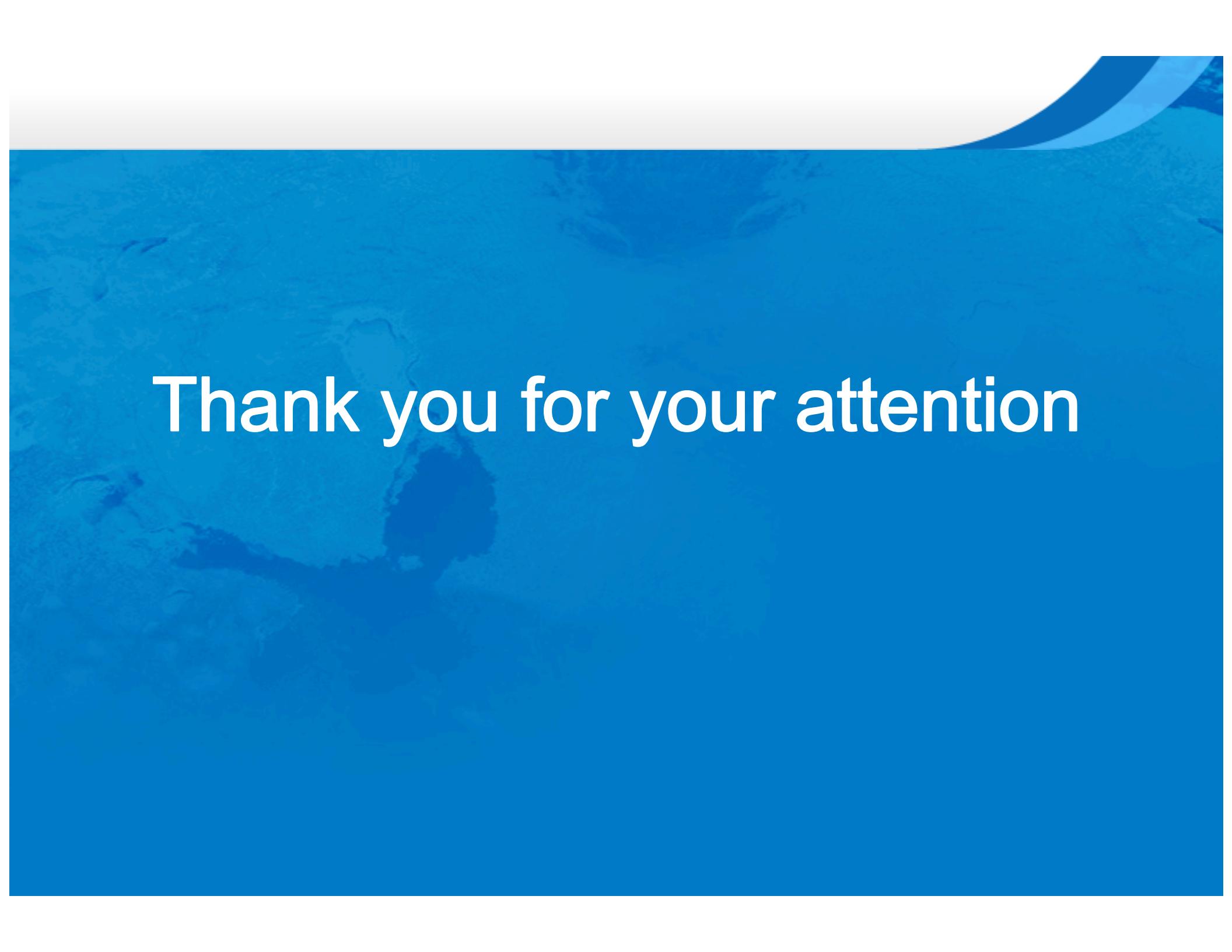
- **GPM GV data exchange with NASA**

- Goals: Validation of the GPM measurements and derived precipitation estimate s.
 - KMA: Providing VN results including radar measurements and QPE data
 - NASA: Providing feedback for VN results and comparison between QPE and sa tellite products
- The GV data are exchanged every season.

- **Collaboration with JAXA**

- The 7th KMA-JAXA collaboration meeting on March 2015 at Tokyo, Japan.
- DPR quick validation/evaluation results over Korea are exchanged.





Thank you for your attention